

POST-OPERATIVE RESIDUAL NEUROMUSCULAR BLOCKADE: INCIDENCE AND CONTRIBUTING FACTORS IN TWO PRETORIA ACADEMIC HOSPITALS

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Background and Objectives

Post-operative residual curarization (PORC) is a clinical problem that can occur with the use of muscle relaxants for surgery. It is a known risk factor for critical peri-operative respiratory events and increased morbidity. We aimed to examine the incidence of PORC, possible contributing factors, and neuromuscular reversal practices of anaesthetists in two academic hospitals.

Methods

This was a prospective observational study of 90 adult patients who received general anaesthesia with muscle relaxants. They were tested for PORC in the PACU using an acceleromyography TOF watch. PORC is defined as a train of four ratio less than 0.90. Concurrently, a questionnaire examining attitudes toward PORC and neuromuscular reversal practices was distributed to the anaesthetists in the two hospitals.

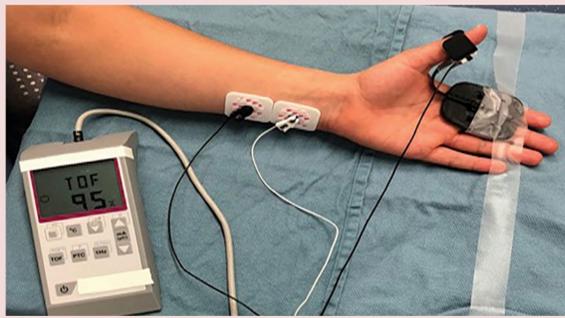


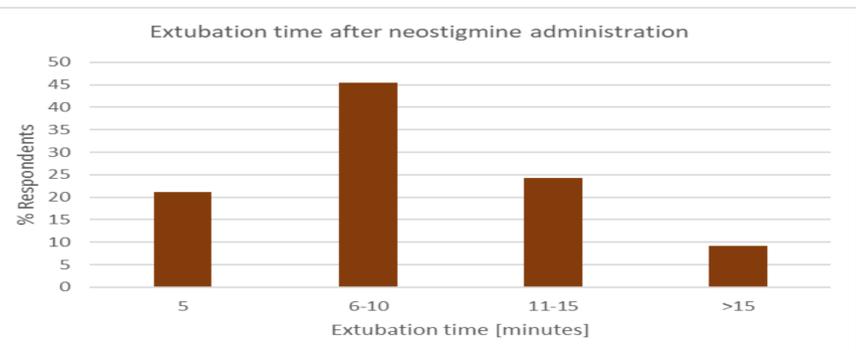
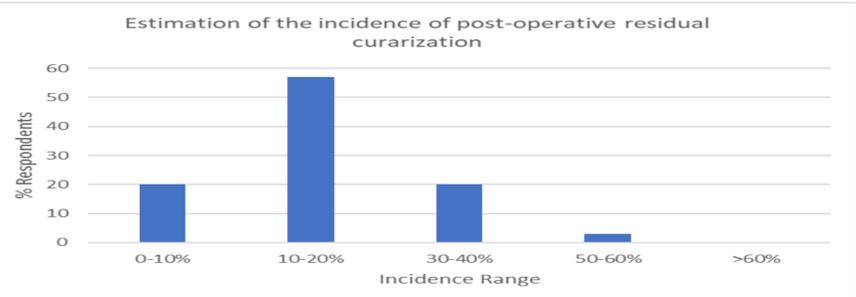
Figure: Train of four measurement using accelerometer TOF watch. ¹

Results

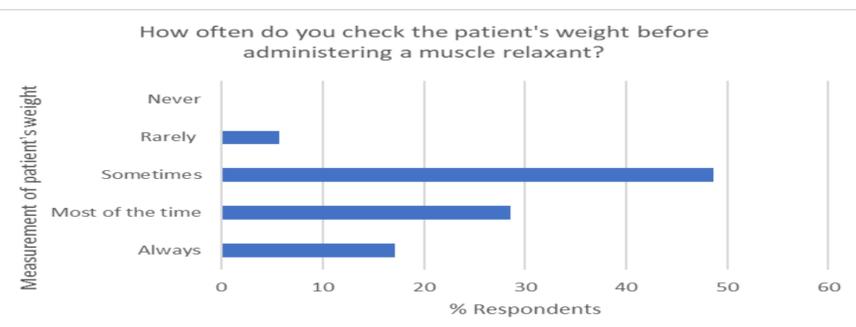
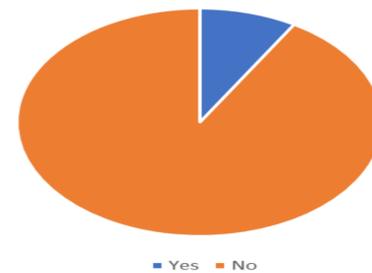
PORC was observed in 18.9% of cases. Intraoperative neuromuscular monitoring was utilised in only 9% of cases. Reversal of neuromuscular blockade using neostigmine occurred in 98% of cases. The incidence of PORC was significantly higher in patients who received larger doses of a muscle relaxant ($p=0.027$), who had a shorter time from last dose of muscle relaxant to end of anaesthesia ($p=0.028$) and in those who had a shorter period from reversal agent administration to the end of anaesthesia ($p=0.001$). A total of 35 trainee anaesthetists completed the questionnaire. Some 57% estimated the PORC incidence to be 10-20%. Most participants (71%) use a fixed dose of neostigmine (2.5mg) for every adult patient regardless of body weight or depth of neuromuscular blockade. Most (70.5%) extubate patients ≤ 10 min after reversal, before neostigmine has reached its peak effect.

Contributing factors

Variables	Odds Ratio (95% CI)	p-value
Age	1.002 (0.920 – 1.092)	0.950
Neostigmine Time	0.48 (0.31 – 0.72)	0.001
Total dose	1.05 (1.01 – 1.09)	0.027
Time from the last dose of NDMR	0.96 (0.93 – 0.99)	0.028
Repeat dose	1.71 (0.95 – 3.09)	0.072



Does the TOF count or ratio affect your dosing of neostigmine?



Discussion

The perceived incidence of PORC amongst trainee anaesthetists was comparable to what we found in this study. Inappropriate dosing, (if a patient is given much higher doses than they need), clearly contributes to PORC. A short interval between the last dose of muscle relaxant and administration of reversal agent, increases the risk that neostigmine can be given while the patient still has a profound level of neuromuscular blockade.

Conclusion

PORC remains a significant peri-operative safety hazard whenever muscle relaxants are used without any monitoring. While the use of intraoperative monitoring in itself may not reduce the incidence of PORC, when used correctly and interpreted accurately, adequate doses of muscle relaxant and neuromuscular reversal agent can be given and adequate reversal will be ensured before a patient is extubated. More training emphasis on routine use and interpretation of neuromuscular monitoring is needed at the two institutions.

1) Stoelting R. What would you expect if you were the patient. From: <https://www.apsf.org/article/monitoring-of-neuromuscular-blockade> Accessed 13 August 2021